



# WEATHERIZATION

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# What is Weatherization?



## Weatherization Definition

A process that uses diagnostic technologies and proven practices to make a home:

- More energy efficient
- More comfortable
- More affordable
- Safer and healthier
- Less polluting



# The House is a System

Weatherizing a home is based on the fundamental principle that a “house is a system” comprised of 3 interactive parts:

- 1.The Shell
- 2.Mechanical equipment
- 3.People





## The House Is A System

- To maximize energy efficiency and home performance opportunities , the weatherization process must address all components of the system.



## The Weatherization Process

- You can't fix, change or improve something without first identifying the problem and the potential solutions.
- Therefore the first step in the process is to hire a certified and experienced energy auditor.
- [www.dmme.virginia.gov/DE/ARRA-Public/EnergyAuditors.xls](http://www.dmme.virginia.gov/DE/ARRA-Public/EnergyAuditors.xls)



## The Energy Audit

An energy audit is a comprehensive examination of your house as a system and will include the use of sophisticated diagnostic equipment to include:

- A blower door
- HVAC efficiency, safety, and combustion analyzing equipment
- Duct diagnostic tools (Duct blaster)
- Infrared Thermal Imaging equipment

## Combustion Safety

- No weatherization work should be done until all combustion appliances are tested for combustion safety, proper draft, efficiency, carbon monoxide, and proper venting.
- Tightening a house with unaddressed combustion safety issues will put the occupants at great risk.
- Unsafe and inefficient systems may need to be replaced as part of the weatherization process.



# Combustion Safety



# Combustion Safety



## Blower Door Test

A blower door test will measure:

- Air leakage and air exchange
- Pressure differences
- Identify thermal bypasses
- Diagnose simple duct system leaks





## Blower Door Test



**Manometer**



**Pressure Pan Testing**

## Common Air Leakage Areas



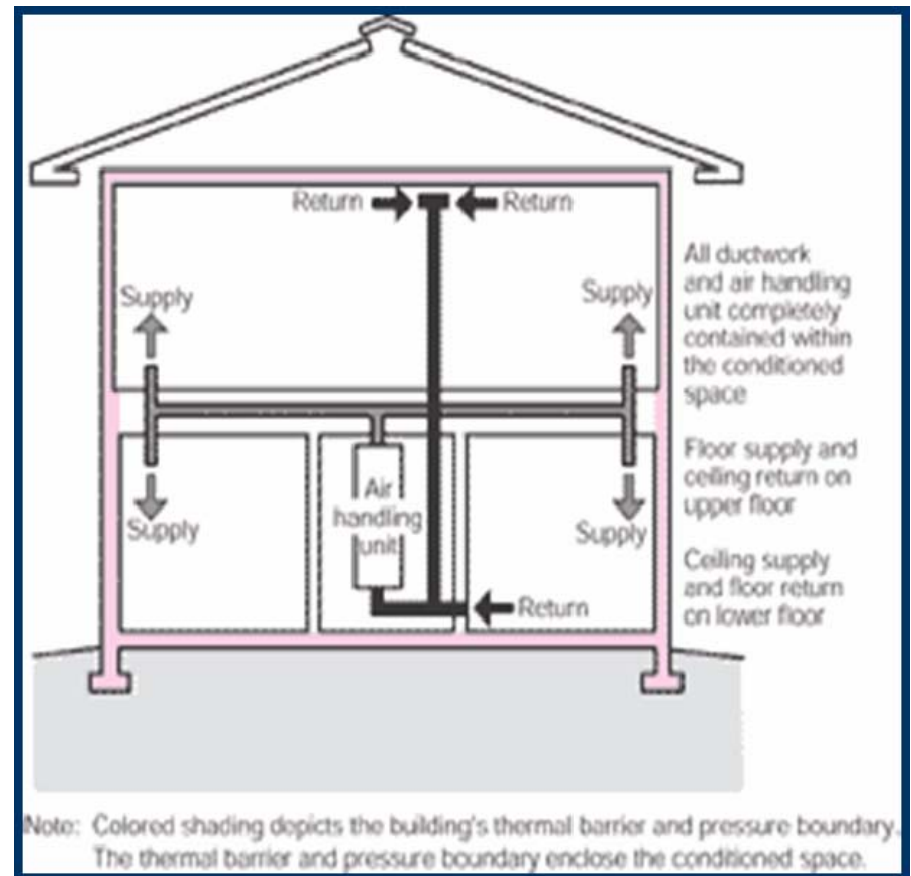


## Air Leakage Fixed



## Duct Diagnostics

- Leaky duct systems can account for 30-40% of total heating and cooling loss.
- Leaky ducts can cause serious health and indoor air quality problems.



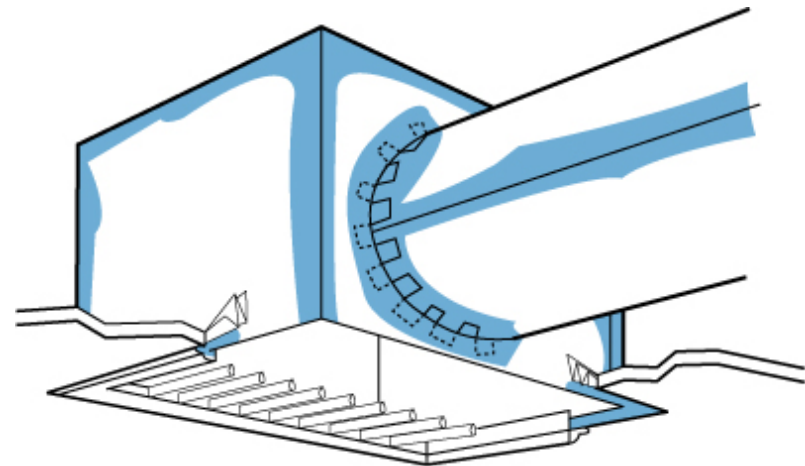
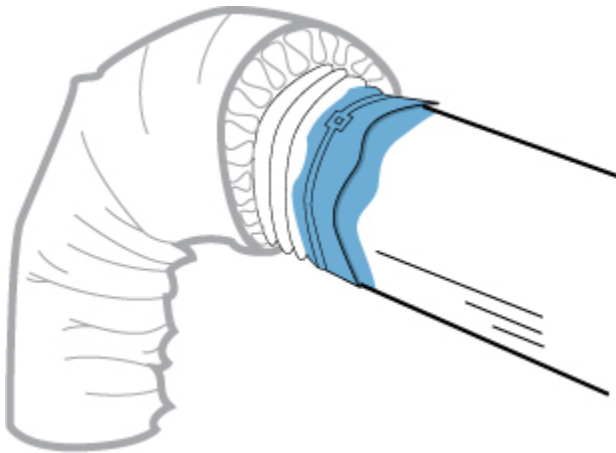
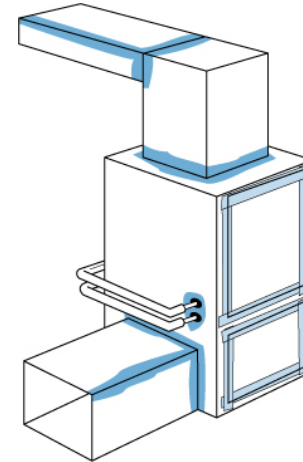
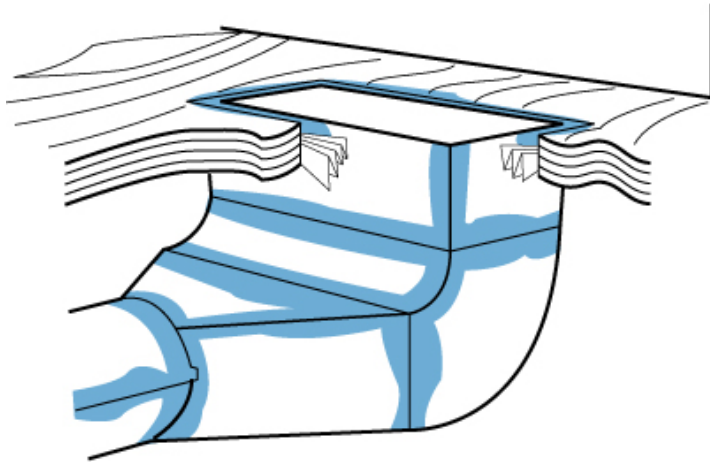
**Out of Sight Out of Mind**

## Duct Diagnostics

- Duct systems can only be tested by a certified professional.
- Ducts must be tested before and after any duct sealing is done.



## Duct Diagnostics



## Duct Diagnostics





## Duct Diagnostics

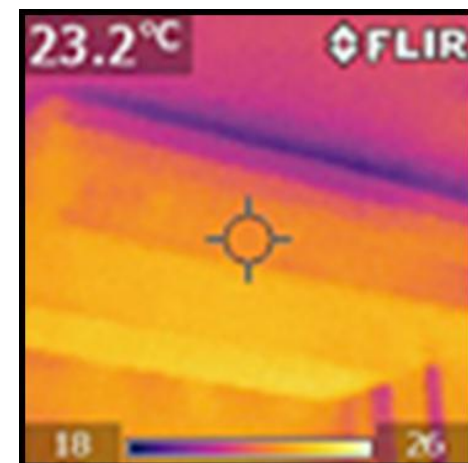
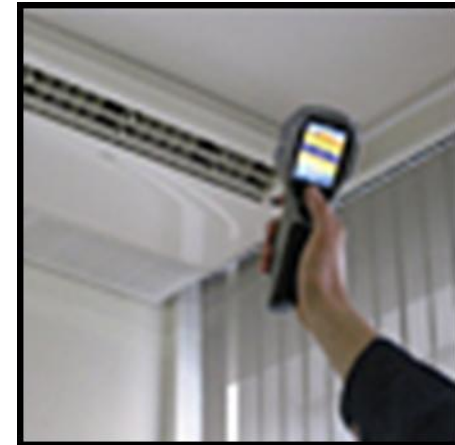
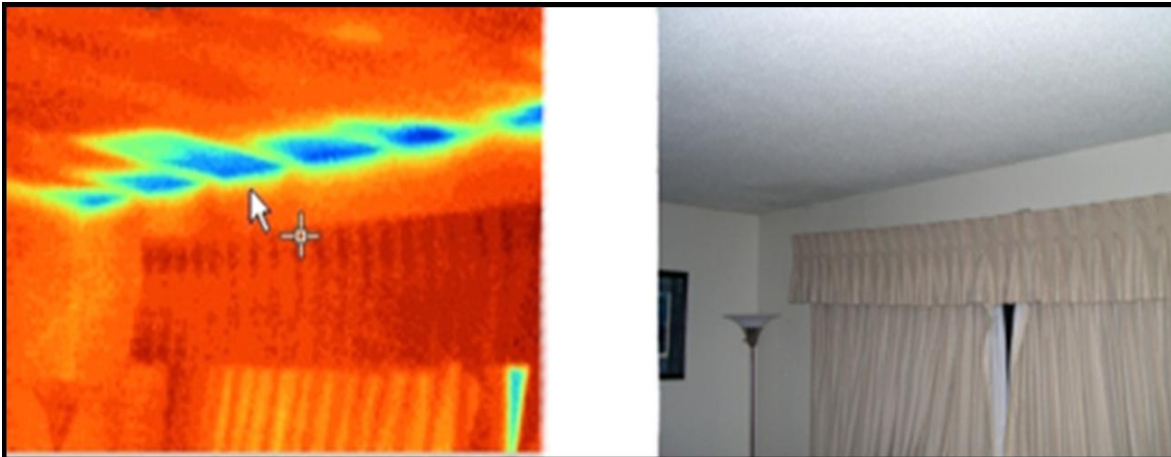


## Infrared Scan

- Using an infrared camera is essential to identifying areas in the building shell with no insulation and/or insulation voids.
- Infrared technology creates imagery based on temperature differences.
- It is like an x-ray of your home.



## Infrared Scan



# Insulation

- Insulation keeps you warm in the winter and cool in the summer.
- This is probably the most cost-effective weatherization application.
- [http://www.ornl.gov/sci/roofs+walls/insulation/ins\\_01.html](http://www.ornl.gov/sci/roofs+walls/insulation/ins_01.html)





# Insulation





## Baseload Measurements

- A big part of weatherizing a home should be a complete examination of the age and efficiency of existing appliances.
- Particularly refrigerators, water heaters, washing machines and dishwashers.



## Lighting

- The weatherization process should include an examination of lighting in the home.
- Incandescent lights – particularly high use lights – should be replaced with compact fluorescent bulbs (CFB) and or Light Emitting Diodes (LED).



## Weatherization Assistance Program

- There is a federally funded program that provides weatherization services to income eligible individuals and families.
- It is the oldest, most comprehensive, residential energy efficiency program in the country.
- Created in 1976 – it operates in every town, city, and county in the USA.



## Weatherization Assistance Program

- All of the measures and applications previously discussed were pioneered and are put into best practice by the program.
- 22 non-profit programs provide services in Virginia.
- Total Action Against Poverty (TAP) provides services in the City of Roanoke and Roanoke Valley.





## COMMUNITY ALLIANCE FOR ENERGY EFFICIENCY

- A regional and collaborative partnership between local governments, non-profits, educational institutions and the private sector to promote and provide energy efficiency.
- Managed by Community Housing Partners in Christiansburg, VA.
- There will be an opportunity for consumers who do not qualify for low-income weatherization to have their home weatherized.
- Participants will have a professional energy audit done, be able to finance the work thru a low-interest loan source, and then have the work done by a certified contractor.
- All work will be tested and inspected for quality and best practice.
- [www.cafe2.org](http://www.cafe2.org)



## Weatherization Impact

- When we effectively weatherize our homes we save money and make those homes more affordable, safer, and healthier and we also reduce consumption of energy.
- This means we use less electricity, less coal and we burn less fossil fuels.



## Weatherization Impact

And when we reduce consumption we reduce the impact of:

- Mercury poisoning
- Acid rain
- Fine particulate matter
- Global warming/Climate change.



## Key Points

- The first step in the weatherization process is to have a professional audit performed.
- Be sure that no weatherization work is done until all combustion safety issues have been corrected.
- Be sure that your duct system is tested for leakage.
- Weatherizing a home will save money and make the dwelling more comfortable, safer, healthier, and it will also have a positive impact on our natural environment.